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SOME DIFFERENT TYPES OF ESSENTIAL HYPERTENSION: THEIR COURSE AND PROGNOSIS*

Since the recognition of the clinical syndrome of essential hypertension forty years ago, much has been learned in regard to its abnormal physiology and ultimate course. It became obvious that there were many cases of essential hypertension which did not belong in the group of rapidly progressive cases, nor could they be termed cases of benign or simple hyperpiesia. Gradually, a group could be identified in which the presence of mild vasospastic retinitis was an important diagnostic feature. The course was less rapid and remission of symptoms sometimes occurred. We have identified another group, the salient features of which are more marked hypertension and more distinct narrowing and sclerosis of the retinal arterioles than encountered in the benign cases, and yet there is no demonstrable break in retinal, cerebral, cardiac, or renal function.

To avoid confusing descriptive terms, the groups have been given numbers. We have considered the usual benign cases as belonging to group 1; those of more marked hypertension, without retinitis, presenting few untoward symptoms as belonging to group 2; those of mild vasospastic retinitis as belonging to group 3, and those revealing the so-called malignant hypertension syndrome as belonging to group 4.

Groups

Diffuse arteriolar disease with hypertension, Group 1.**—Many of the cases described by Allbutt, Janeway, and others as cases of hyperpiesia or essential hypertension belong in this group. The hypertension can be of long duration without causing symptoms and without impairing general health. Cardiac and renal functions continue to be adequate and changes in the retinal vessels are minimal. Albuminuria may be of a slight degree or may be absent and, in spite of the gradual development of hypertrophy of the heart, electrocardiologic examinations may give evidence of normal findings for many years. The hypertension as a rule does not rise to extreme heights, and among many individuals falls to normal levels during sleep. With moderate protection of the vascular system, the prognosis is usually good. Happily, the majority of cases encountered in practice fall into this group.

Diffuse arteriolar disease with hypertension, Group 2.—Patients of this group have a higher and more sustained hypertension than those of group 1. They may complain of being more nervous than formerly, but their general health is good and their cardiac and renal functions are satisfactory. The changes in the retinal vessels are more marked than in group 1, but retinitis is not present. In a study of these patients, the impression is obtained that the disease is more progressive than in cases belonging to group 1.

Diffuse arteriolar disease with hypertension, Group 3.—In this group, the hypertension is often high and sustained. On palpation, diffuse changes in the arteries usually can be demonstrated such as thickened, rubber-like radial, brachial, superficial temporal, posterior tibial, and dorsalis pedis arteries. Although cardiac and renal functions may be adequate, sometimes there are minor alterations in function as indicated by dyspnea on exertion, characteristic changes in the electrocardiogram and nocturia. Nervousness, headache, and vertigo are often annoying symptoms and visual disturbances may occur. Albuminuria and microscopic hematuria may be present. An important criterion is the presence of angiospastic retinitis, together with definite sclerotic changes in the arterioles, but edema of the disks is not present. Changes in the arterioles of muscles are more numerous and more marked than among patients belonging to group 1.

It is of great interest that, even in cases of group 3, there may be a remission in the activity of the pathologic process. The patient feels better and stronger and headaches or vertigo may disappear. There is evidence in the retina of previously active retinitis and some small arterioles may even become obliterated.

Diffuse arteriolar disease with hypertension, Group 4.—All observers are agreed that patients belonging to this group are in a very serious condition. The characteristic symptoms are nervousness, asthenia, loss of weight, headache, visual disturbances, dyspnea on exertion, and nocturia. Also, there may be obvious neurologic lesions. The objective findings are a persistently elevated blood pressure, palpable diffuse arterial thickening of the peripheral arteries, and retinal changes. The important retinal

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** We prefer this term to that of essential hypertension because it stresses the importance of dynamic or organic changes in the arterioles. There are always, however, coexisting changes of varying degree in the arteries.

IMPORTANT ANNOUNCEMENT!

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alteration is edema of the disks. There is also marked spastic and organic narrowing of the arterioles with diffuse retinitis. Albuminuria, cylindruria, and erythrocytes are usually present. Cardiac and renal functions may be adequate but, sooner or later, they become impaired. Associated with the terminal picture, there may be failure of the functions of the brain, heart, and kidney simultaneously. This fact suggests widespread anoxemia owing to decreasing arteriolar blood supply. We have observed a few cases of group 4 in which the course was very rapid. The significant symptoms were sudden severe headaches, gross hematuria, and pains in muscles, accompanied by a persistently high blood pressure, marked narrowing of the retinal arterioles without apparent sclerosis and absence of distinct changes in the arterioles of muscles. A progressive, angiospastic mechanism seems to offer the best explanation. Evidence is also accumulating that, even when there is marked pathologic change in the arterioles, as in some cases of group 4, compensatory mechanisms, at present obscure, still may permit periods of improved metabolism in tissues and a reasonably comfortable existence.

To distinguish clinically between the four groups usually is not difficult. Some patients may have to be observed over several months to determine whether they belong to group 1 or 2. A given case may be markedly progressive so that although at first examination it appears to belong to group 1 or 2, it may rapidly assume the characteristics of group 4. On the other hand, there are cases in which there is little progression over a period of many years; a majority of these belong to group 1, but a moderate number to group 2 and a few to group 3. Because the arterioles throughout the organs of the body seem to be the chief point of attack and can be visualized readily only in the retina, the findings obtained on ophthalmoscopic examination are very important. Patients who have only mild narrowing (increased tonus) or sclerosis of the retinal arterioles usually will fall into group 1. Patients usually are placed in group 2 if they have moderate to marked sclerosis of the retinal arterioles, whether of the chronic type, characterized especially by exaggeration of the arterial reflex and arteriovenous compression, or of the postangiospastic type, characterized especially by generalized and localized irregular narrowing of the arterioles. Thrombosis of retinal veins or retinitis of the arteriosclerotic type may occur among patients of this group.

Patients who have retinitis of the angiospastic type, characterized especially by edema, cotton-wool patches, and hemorrhages in the retina superimposed on a combination of sclerotic and spastic lesions in the arterioles, belong to group 3. If measurable edema of the disks is added to this picture the case belongs to group 4. Diffuse retinitis and edema of the disks may develop in association with active spastic narrowing of the arterioles in certain cases of hypertensive disease of acute onset. This type of retinitis may subside at times without the development of additional anatomic changes in the arterioles which characterize the typical case of group 4.

Histologic Study of Arterioles of Muscles

The histopathologic study of the arterioles in small portions of the pectoralis major muscle obtained by biopsy in this series of cases has confirmed the previous work of Kernohan, Anderson, and Keith that organic changes in such vessels do occur in cases of hypertensive disease.

In addition to quantitative changes in the walls of the arterioles, such as a decrease in the wall to lumen ratio, we have observed certain other changes from the normal which we have termed qualitative. These include an increase in the number and size of the nuclei in the arteriolar muscle in association with and more or less commensurate with the decrease of the wall to lumen ratio. Also, we have observed an increase in the number and size of the nuclei in the intima of the arteriole, organized thrombosis, and evidence of arteritis and periarteritis as indicated by the presence of lymphocytes and fibroblasts in the media and adventitia. Also, in some cases, usually those whose ratios of lumen to wall were reduced definitely, a few arterioles have been found in which the lumen was completely closed without the presence of thrombosis. Although we have never seen it in our material, Pilcher and Schwab have actually observed medial necrosis in the arterioles of voluntary muscle in a case of malignant hypertension such as have been described as existing in vessels of comparable size in the kidney and other organs.

A careful analysis of the data obtained from the examination of the arterioles of muscles of 138 of the cases represented in this paper has shown that the changes are not consistent and that there is not a definite correlation between the findings in the arterioles of muscles and the division of cases into the four groups, the clinical severity of the disease, the length of life of the patient after the biopsy was taken, or the changes in the retinal arterioles. When all the data are analyzed, it is found that, in general, a greater percentage of patients who have marked changes in the arterioles of voluntary muscles belong to group 4, have corresponding changes in the retinal arterioles and have a more serious prognosis.

Prognosis

The outlook for patients who have essential hypertension affords a striking example of the variableness of processes of the disease. If the fact is considered that only nineteen patients, or 9 per cent of our entire series of 219, were alive five to nine years after the diagnosis was made, the seriousness of the prognosis for all patients seems obvious. But, on further analysis, the grave outlook is more apparent than real, as a disproportionate number of the cases belong in group 4. There are some patients in each group and as many as 35 to 60 per cent in groups 2 and 1 that are alive for a similar period of five to nine years. These facts emphasize the significance of the original grouping particularly from the prognostic standpoint and also demonstrate that there are two predominating types of essential hypertension, the relatively stationary or benign and the rapidly progressive or malignant.

The prognosis for cases of group 3 and, especially, for cases of group 4 is very serious. Because many more males than females belong to these two groups, the death rate is much higher among males than among females. A death rate, within one year, of 35 per cent, in cases of group 3, and 79 per cent, in cases belonging to group 4, is in distinct contrast with that of 10 to 12 per cent in groups 1 and 2. The mortality rate in cases of group 4 approaches that found in certain forms of cancer.

Comment

In the present attempt to group cases of essential hypertension clinically, we realize that not all cases fall into one of the four groups mentioned. There are many patients who have this condition who have, in addition to arteriolar dysfunction, diffuse arteriosclerosis, more especially of the aorta and of the coronary and cerebral arteries. Atherosclerosis of these arteries may be the determining factor as to the course and prognosis. With more knowledge relative to the occurrence of atherosclerosis in such vital internal arteries and with the aid of more accurate diagnostic methods, these cases might be grouped in a much more satisfactory manner than is possible at present.

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